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1. Iz kabineta endokrinologii laboratorii eksperimental'noy onkologii (zav. - prof. N.V. Iazarev) Instituta enkologii (dir. - prof. A.I. Serebrov) AMN SSSR i otdela mikrobiologii (zav. - prof. Ioffe) Instituta eksperimental'noy meditsiny (dir. - prof. D.A. Biryukov) AMN SSSR.

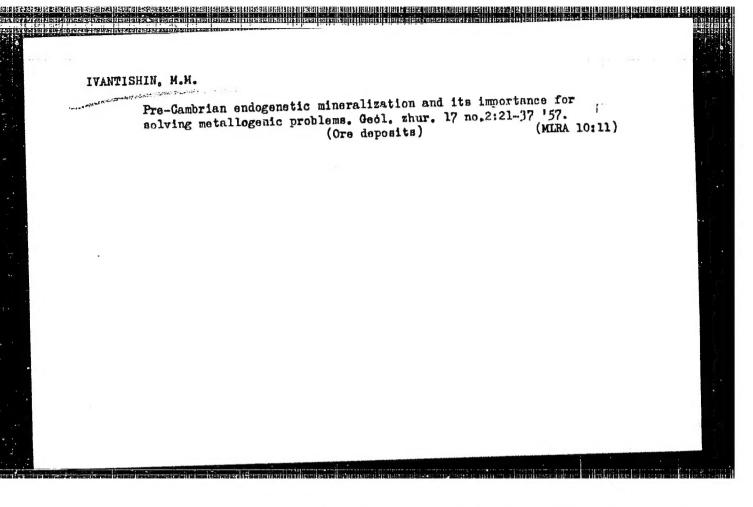
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Izv. Ak Nauk SSSR, Ser. Geol., No. 1, 1958, p. 115-117 author Pekarskaya, T. B.

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(Geological time)

(Geological time)

AYZENVERG, D.Ye., geolog; BALUKENVSKIY, N.F., geolog; BARTOSHKVSKIY, V.I., geolog; BASS, Yu.B., geolog; VADIMOV, N.T., geolog; GLADKIY, V.Ya., geolog; DIDKOVSKIY, V.Ya., geolog; YERSHOV, V.A., geolog; ZHUKOV, G.V., geolog; ZAMORIY, P.K., geolog; CIVANTISHIK, M.H., geolog; KAPTARENKO-CHERNOUSOVA, O.K., geolog; KLIMENKO, V.Ya., geolog; KLUSHIN, V.I., geolog; KIYUSHNIKOV, M.N., geolog; KRASHENINNIKOVA, O.V., geolog; KUTSYBA, A.M., geolog; LAPGHIK, P.Ye., geolog; LICHAK, I.L., geolog; MAKUKHINA, A.A., geolog; NATVIYENKO, Ye.M., geolog; MEDINA, V.S., geolog; MOLYAVKO, G.I., geolog; NAYDIN, geolog; MEDINA, V.S., geolog; POLOVKO, I.K., geolog; RODIONOV, D.P., geolog; SEMENENKO, N.P., akademik, geolog; SERGEYEV, A.D., geolog; SIROSHTAN, R.I., geolog; SLAVIN, V.I., geolog; SUKHARHVICH, P.P., geolog; TKACHUK, L.G., geolog; USENKO, I.S., geolog; USTI-HOVSKIY, Yu.B., geolog; TSAROVSKIY, I.D., geolog; SHUL'GA, P.L., geolog; YURK, Yu.Yu., geolog; YAMNICHENKO, I.M., geolog; ANTEOPOV, P.Ya., glavnyy redaktor; FILIPPOVA, B.S., red. izd-va; GUROVA, O.A., tekhn.red.

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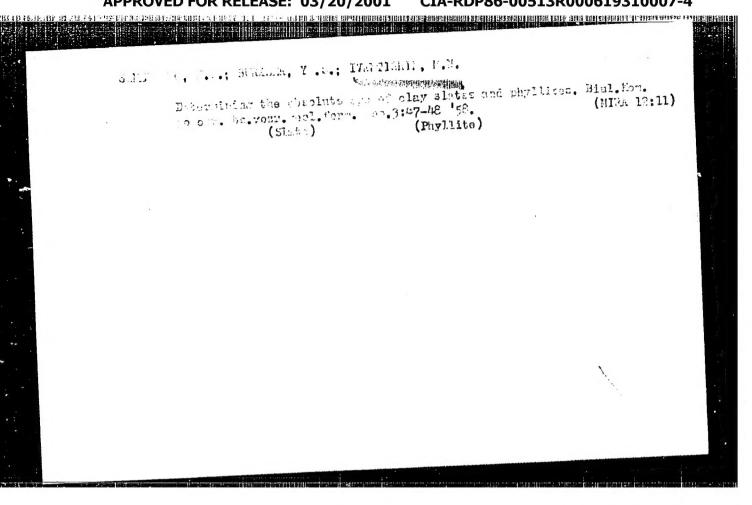
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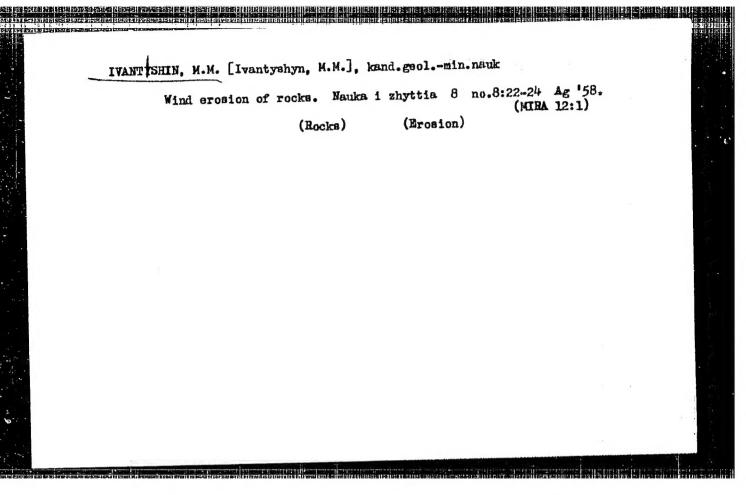
1. Russia (1923- U.S.S.R.) Glavnoye upravleniye geologii i okhrany nedr. 2. Ukrainskoye geologicheskoye upravleniye Ministerstva geologii i okhrany nedr SSSR i Institut geologicheskikh nauk Akademii nauk USSR (for all except Antropov, Filippova, Gurova).

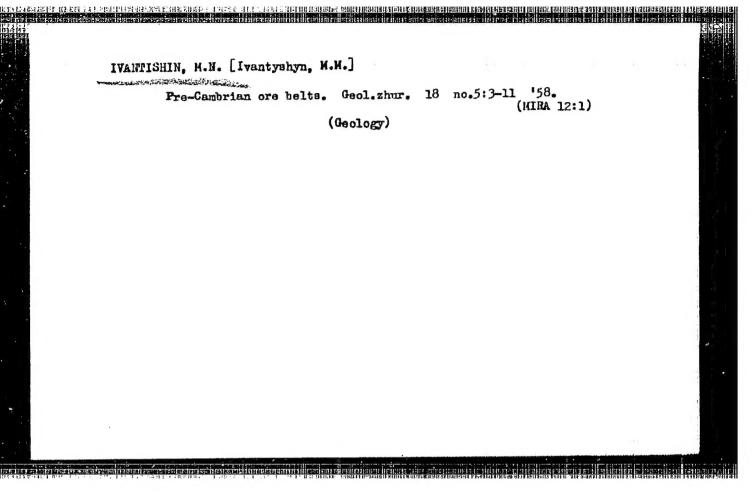
3. Glavnyy geolog Ukrainskogo geologicheskogo upravleniya (for Yershov).

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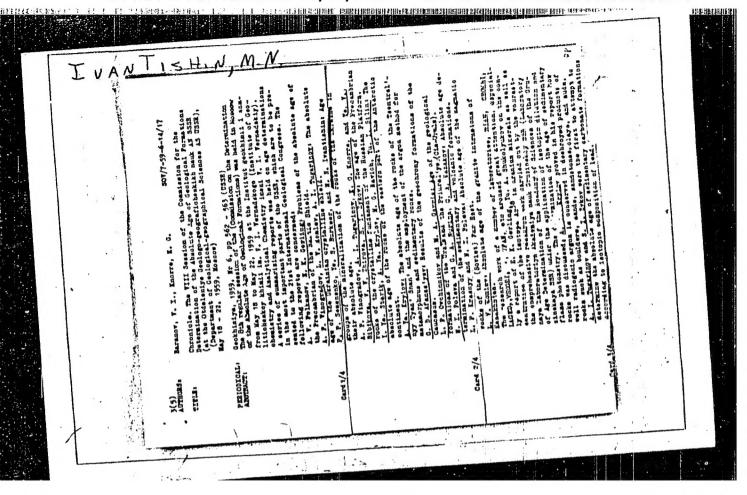
(Ukraine--Geology) (Moldavia--Geology)

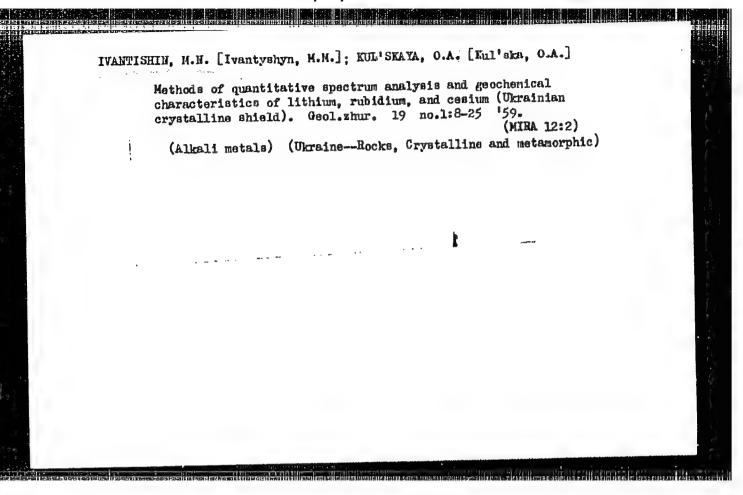






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PLATONOV, A.N., inzh., otv. red.; POVARENNYKH, A.S., doktor prologomin. nauk, prof., glav. red.; AGAFONOVA, T.N., kand. geolmin. nauk, dots., red.; BELEVTSEV, Ya.N., prof., red.; GAVRUSEVICH, B.A., kand. geol.-min.nauk, dots., red.; GLADKIY, B.N., inzh., red.; IVANTISHIN, M.N., doktor geol.-miner. nauk, red.; KHATUNTSEVA, A.Ya., kand. geol.-miner. nauk, red.; ZAVIRYUKHINA, V.N., red.; DAKHNO, Yu.M., tekhn.

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POVARENNYKH Aleksandr Sergeyevich; BURKSER, Ye.S., retsenzent;
IVANTISHIN, M.N., doktor geol.-min. nauk, retsenzent;
ITTVIN, A.L., kand. geol.-min. tauk, otv. red.;
GAVRUSEVICH, B.A., dots., red.; ZAVIRYUKHINA, V.N., red.;
LISOVETS, A.M., tekhn. red.; REKES, M.A., tekhn. red.

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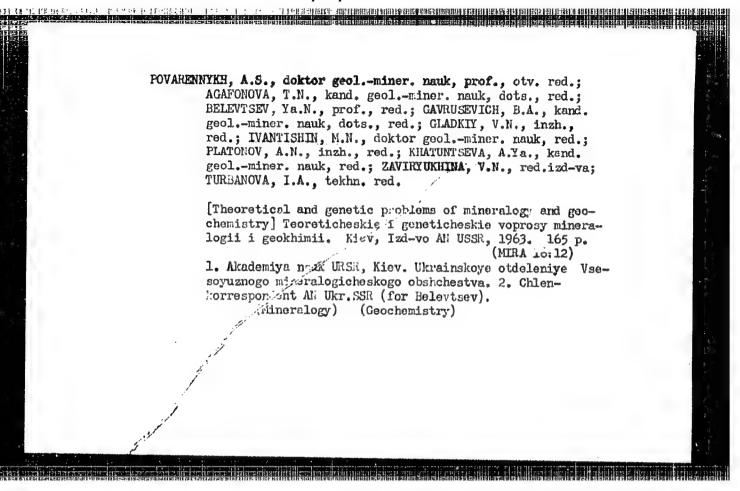
SEMENENKO, M.P., akademik, otv. red.; FOVARENNYKH, O.S., doktor geol. nauk, prof, zam. otv. red.; BURKSER, E.S., red.; IVANTISHIN, M.M. [Ivantyshyn, M.M.], doktor geol.-min. nauk, red.; TKACHUK, L.G. [Tkachuk, L.H.], doktor geol-min, nauk, prof., red.; SHNYUKOV, E.F., kand. geol.-min. nauk, red.; LISOVETS', O.M. [Lysovets', O.M.], tekhn. red.

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(Geochemistry) (Mineralogy) (Petrology)

(Geochemistry) (Mineralogy) (Petrology) (Vernadskii, Vladimir Ivanovich, 1863-1945)



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GAVRUSEVICH, B.A., kand. geol.-miner. nauk, dots., red.;

IVANTISHIN, M.N., doktor geol.-miner. nauk, red.; LAZARENKO,

Ye.K., prof., red.; LOGVINENKO, N.V., doktor geol.-miner.

nauk, prof., red.; MITSKEVICH, B.F., kand. geol.-miner. nauk

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AN UkrSSR H.P.Semenenko [Semenenko, M.P.].

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Oliga Adolifovna; YELTSEYEVA, Galina Dmitripevna, Prinimali
uchastiye: GAVRILOVA, E.F., inzh.-khimik; KAZANTSEVA, A.I., inzh.khimik; LOGVINA, L.A.,inzh.-khimik; USLONTSEVA, L.A., inzh.khimik; GUDIMENKO, L.F., inzh.; NAZAREVICH, Ye.S., inzh.;
SHKVARUK, R.N., inzh.; CRLOVA, L.A., inzh.; BASHMAKOVA, C.G.,
inzh.-geolog; BURKSER, Ye.S., otv. red.; MELINIK, A.F., red.

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AGAFONOVA, T.N., kand. geol.-miner. nauk, dots., red.;

GAVRUSEVICH, B.A., kand. geol.-miner. nauk, dots., red.;

GLADKIY, V.N., inzh., red.; IVANTISHIN, M.N., doktor

geol.-miner. nauk, red.; IJGVINENKO, N.V., doktor geol.
miner. nauk, prof., red.; PLATONOV, A.N., inzh., red.;

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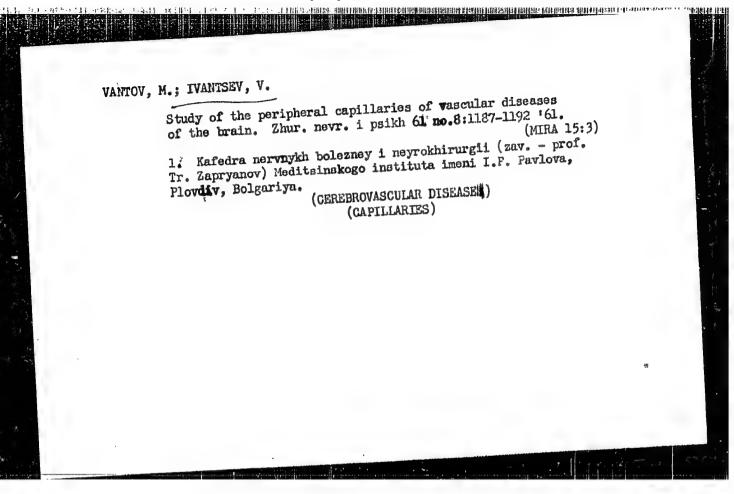
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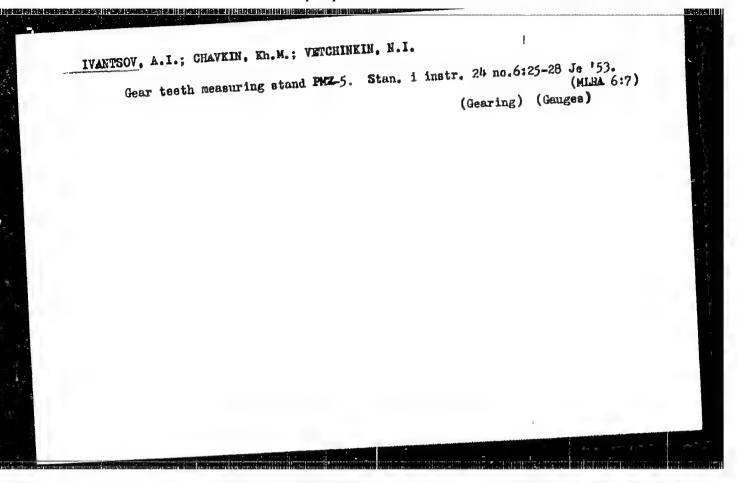
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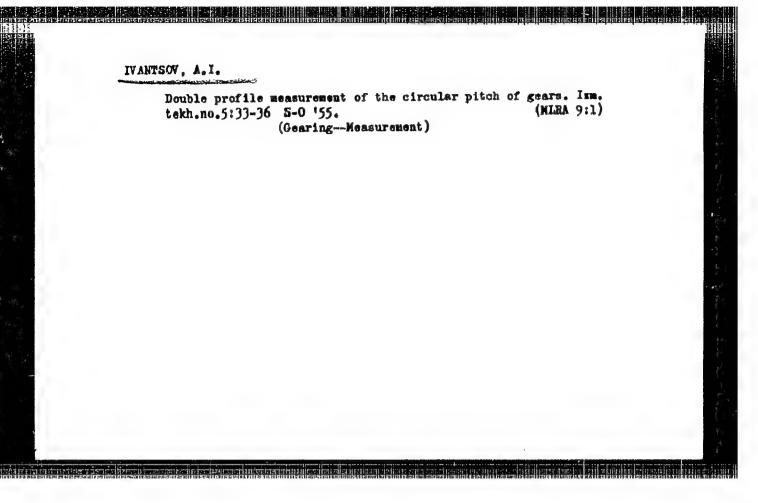
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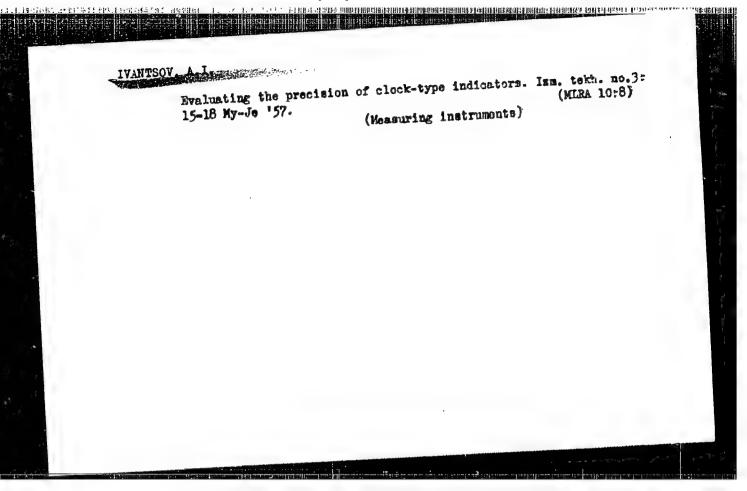
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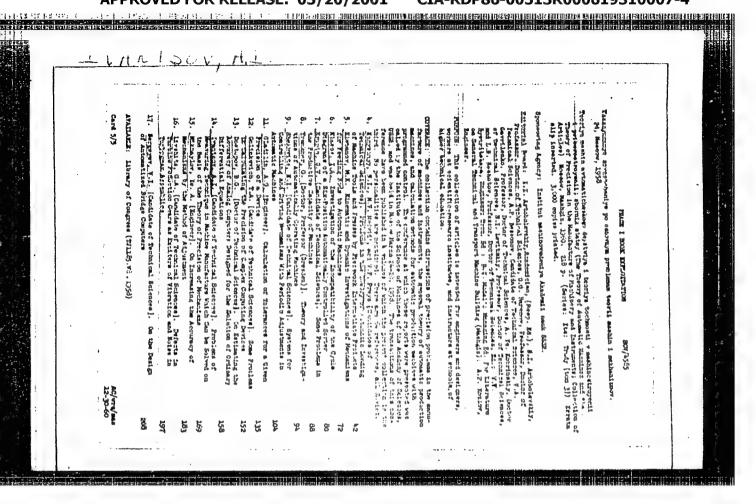


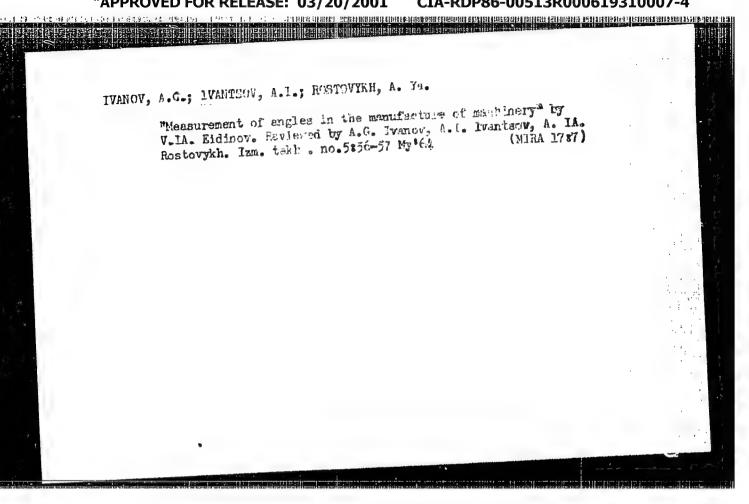
IVANTSOV, A. Y.

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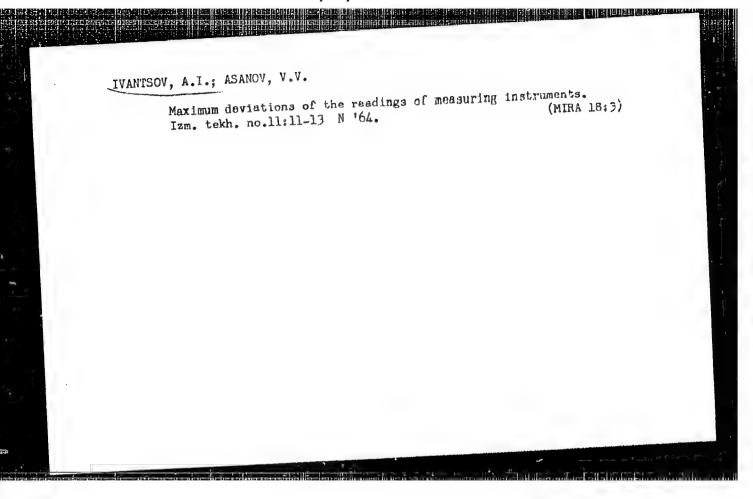
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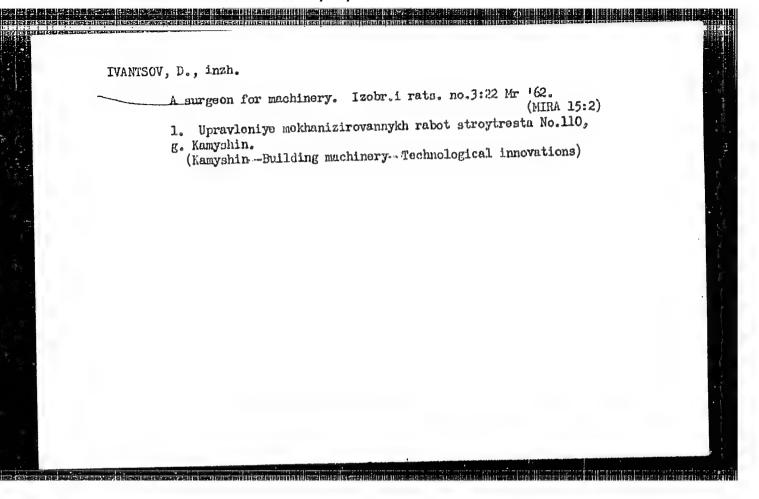
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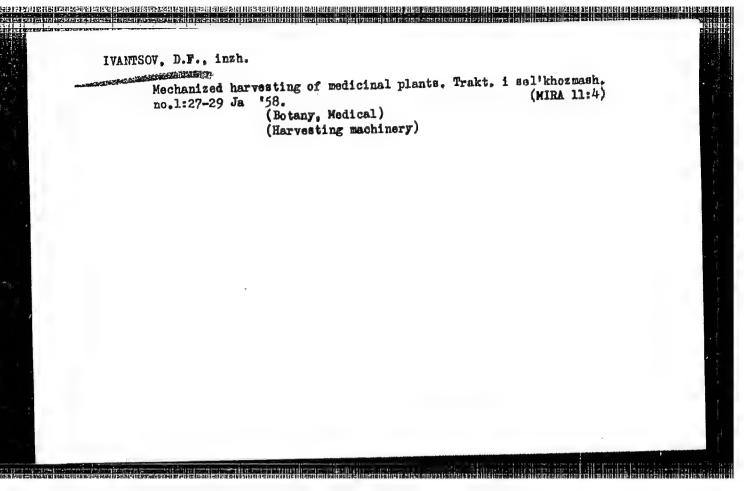


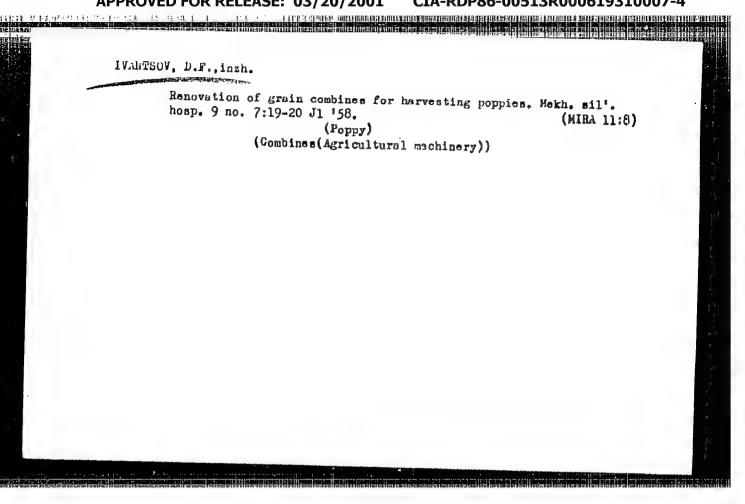


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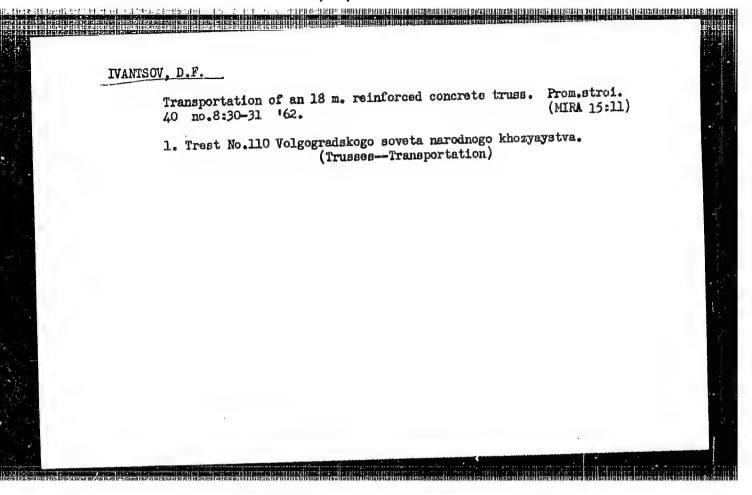


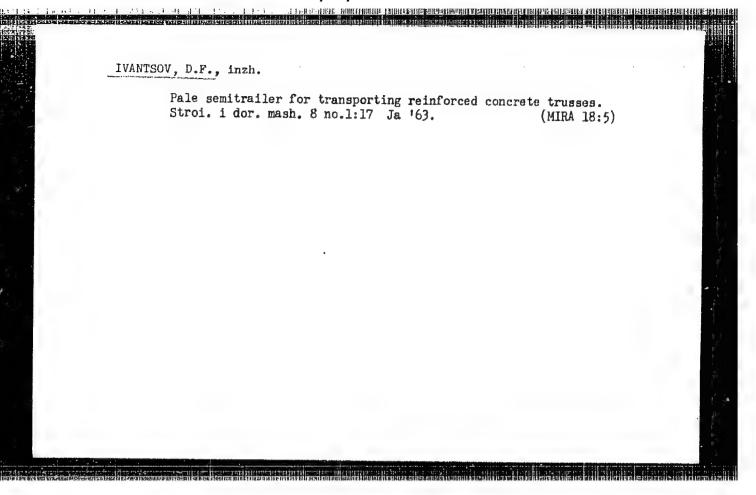


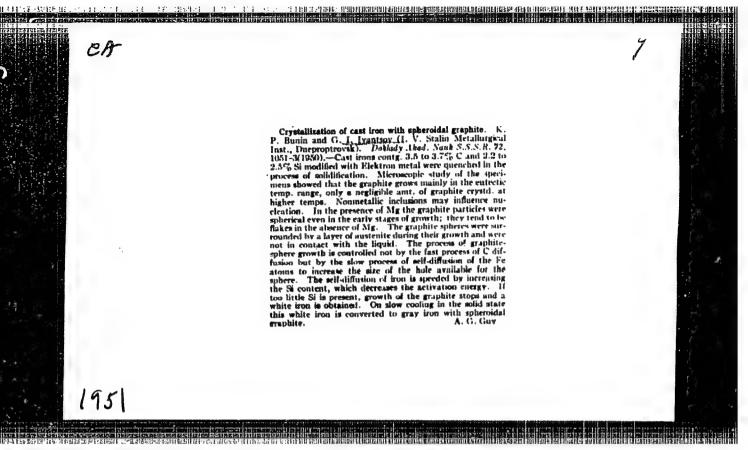


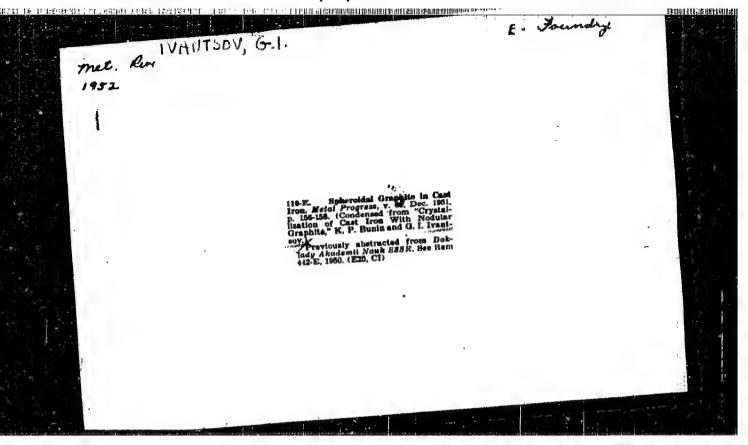


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IVANTSCV, G. I. PHASE I

Call No.: TMG93.178857

Author: IVANTSCV, G. I., BUNIN, K. P, and MALINCCHKA, Is. N. Full Title: STAUCTURE OF CAST IRON

Transliterated Title: Struktura chuguna

Publishing Data

Originating Agency: Mone

Publishing House: State Publishing House of Scientific-Technical Mach. Bldg.

Literature (Mashgiz).

Date: 1952. Kiev.

No. pp.: 161

No. comies: 5,000

Editorial Staff

Editor: Prof. V. N. Gridnev

Ed.-in-Chief: V. K. Serdiuk, Engineer

Tech. Ed.: None

Appraiser: Prof. K. E.

Vashc'nenko

Text Data

Coverage: The work treats the basic principles of cast iron metallography.

Processes of crystallization and recrystallization in austenite,

graphite, and carbide and structural changes are considered in terms

of molecular physics. 97 diagrams.

The work is written for metallographic engineers and foundry personnel.

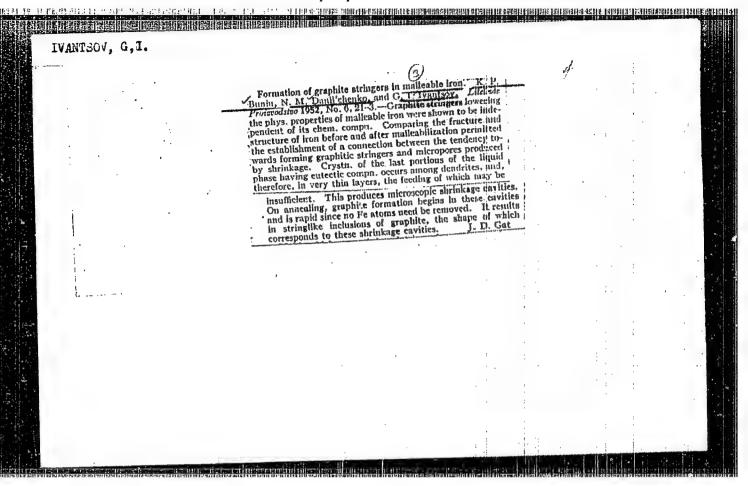
Asst. Prof. Is. V. Grechnoi and N. E. Danil chenko. Engineers:

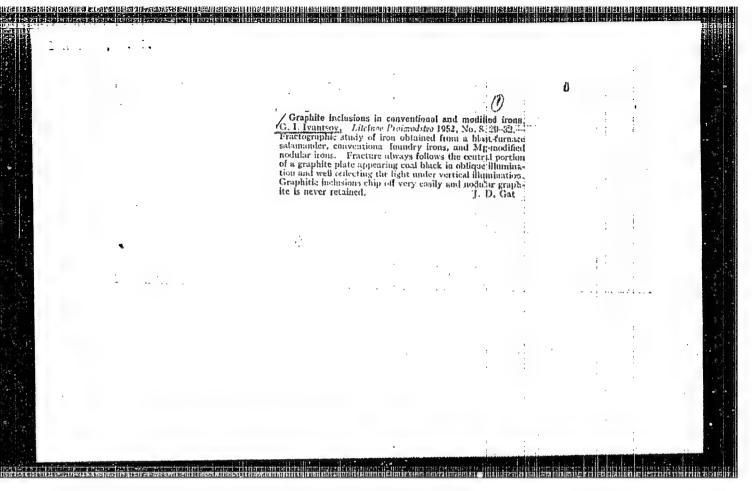
Dolinskoi, L. A., Kozyrev, I. F., Krishtal, M. A., Taran, Iu. M., and Ian, M. M.

Facilities:

No. Russian and Slavic References: 46

Available: Library of Congress.





IVANTSOV, G. I.

Pro Commentum on Italia Frizes (of the Comment of Ministers Unce) to the fields of solutions and inventions encourses that the following ectentific worse, popular actor-tifit books, and textopoks have been sommitted for competition for Chelin Frizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 32-47, 20 Feb - 3 Apr 1994)

Name

Title of Work

Homforted by

Bunin, K.P <u>Ivantsov, G.I.</u> Malinochka, Ya. N. "Structure of Cast Iron"

Dnepropetrovsk Metallurgical Institute

100 - 4-30504, 1 July 19 A

AUTHOR:

Ivantsov, G.I., Candidate of Pechnical Sciences. 129-4-2.1,

TITIE:

Mechanism of the influence of low temperature annealing of white iron on the quantity of graphitisation centres during subsequent annealing. (Mekhanizm vliyaniya nizkotemperaturnoy vyderzhki belogo chuguna na kolichestvo tsentrov grafitizatsii pri posleduyushchem otzhige.)

PERIODICAL: "Metallovedenie i Obrabotka Metallov" (Metallurgy and Metal Treatment) 1957, No. 4, pp. 9 - 16 (U.S.S.R.)

ABSTRACT:

Applying an equal casting and annealing technology for an equal composition of iron acceleration of the graphitisation is achieved either by preliminary hardening of the components or by holding of such components for four to six hours at 300 to 350 °C. It was experimentally proved that a rapid acceleration of the graphitisation of iron and steel after hardening is due to the formation of hardening cracks which serve as locations of formation of graphite nuclei during subsequent annealing. The effect of low temperature holding is mostly attributed to the phenomenon of braking of graphite formation by hydrogen at elevated temperatures, which is eliminated during the holding time. Zubarev (7) assumes that an increase in the number of the graphitisation centres is explained by the disintegration of cementite in local volumes under the influence of tensile stresses caused by separating out of hydrogen and formation of methane. In earlier work

Card 1/6

Mechanism of the influence of low temperature annealing of white iron on the quantity of graphitisation centres during subsequent annealing. (Cont.) 129-4-2/17

the author of this paper and colleagues of his (8) explained the influence of low temperature holding from the point of view of the general theory of phase transformations, taking into consideration the re-distribution of the thermal defects in the crystal lattices of the solid phases of white iron. Micro-photos on p. 10 represent the structure of malleable iron in the as cast state and after graphitisation annealing for telescopically cast specimens with diameters varying between 5 and 30 mm changing by steps of 5 mm with the chemical composition: 2.62% C, 0.8% Si, 0.32% Mn, 0.07% Cr, 0.08% S, 0.11% P, 0.01% Al. Details are given of the heat treatment and the results are summarised in Table 1, p.10. A change in diameter from 30 to 15 mm brings about an increase in the graphite inclusions per 1 mm2 which is directly proportional to the branching of the austenite dendrites, i.e. to the surface of division between the ledeburite cementite and the austenite. From the step of 10 mm dia. onwards the increase in the number of graphite inclusions is considerably larger than the increase in the extent of branching. Thus, a definite relation was established between the branching of the austenite dendrites and the number of

Card 2/6

white iron on the quantity of graphitisation centres during subsequent annealing. (Cont.)

129-4-2/17

graphite inclusions for the steps between 30 and 15 mm dia. but this relation does not seem to exist for steps of smaller diameters. It was found that the lower the preliminary holding temperature the more effective it will prove; the optimum being holding at 320 °C for four hours. For each preliminary holding temperature there is a specific frequency of germination of the graphite during subsequent annealing and this will be the lower the higher the holding temperature; isothermal annealing at a given temperature for a sufficiently long time liquidates the effect of subsequent annealing at a lower temperature and this was experimentally confirmed for temperatures above 450 °C. Continuous heating of components at 250 to 420 °C at a rate of about 2 °C/min and lower is equivalent to a low temperature isothermal holding at the optimum temperature; the heating speed above 420 °C has practically no influence on the frequency of germination of the graphite in the first stage. Introduction into the iron melt of hundredths of a percent of aluminium prior to casting increases by many times the effectiveness of the influence of low temperature holding

Card 3/6

Mechanism of the influence of low temperature annealing of white iron on the quantity of graphitisation centres during subsequent annealing. (Cont.) 129-4-2/17

under otherwise equal conditions. If the assumptions on the role of micro-cavities in graphite germination made in an earlier paper (8) are correct, such holding should bring about an increase of the frequency of germination of the graphite even in cases in which micro-cavities are produced specially, for instance, by hardening or deformation; this assumption was verified on specimens of equal composition but taken from the central, densest parts of the casting. The authors prove that low temperature holding does produce conditions for growing in micro-cavities of graphite nuclei which are capable of developing during subsequent high temperature annealing. The problem of germination of graphite in the case of holding at above eutectoidal temperatures after rapid heating of cast and hardened white irons is considered mainly on the basis of experimental data of Owen and Wilcock (16), Frenkel (17.), Fast and Verrijp (18). It was found that after rapid heating of hardened cost iron It was found that after rapid heating of hardened cast iron to temperatures corresponding to the first stage, about a quarter of the largest cracks will become graphitisation centres, whilst three-quarters are not being utilised for that purpose. Existence of large graphite inclusions together with numerous small ones indicates that the formation

Card 4/6

Mechanism of the influence of low temperature annealing of white iron on the quantity of graphitisation centres during subsequent annealing. (Cont.) 129-4-2/17

of the graphite nuclei takes place at various times. Since hardening of the iron ensures the formation of numerous stable nuclei, which are not linked with the boundaries of cementite-austenite division, the process of liquidation of ledeburite cementite during subsequent annealing will be very much simplified. For determining the germination of graphite at temperatures below the eutectoidal in the as graphite at temperatures below the eutectoidal in the as cast and in hardened irons, experiments were carried out with cast specimens which were held at 320°C for 1 000, 2 000, 3 000 and 5 000 hours respectively. It was found that the lower the holding temperature, the smaller are the defects which can be occupied by graphite but the longer has to be the holding time. Low temperature isothermal holding can be substituted by slow heating of the components at 300 to 400°C since such heating ensures the necessary formation of the graphite nuclei on the basis of the micro-defects. of the graphite nuclei on the basis of the micro-defects.

There are 4 tables, one set of 4 micro-photographs and 19 references, of which 16 are Slavic.

Card 5/6

1 VAN-7364 & 1

137-1958-3-5028

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 3, p 82 (USSR)

AUTHORS: Zlatoustovskiy, D. M., Litovchenko, N. V., Ivantsov, G. I.

TITLE: Improving the Durability of the Rolls in the Finishing Stands of a Rod-rolling Mill (Povysheniye stoykosti valkov otdelochnykh

kletey provolochnogo stana)

PERIODICAL: Sb. nauchn. tr. Magnitogorskiy gornometallurg. in-t, 1957, Nr 11, pp 296-312

ABSTRACT: The employment of rotating calibrating rollers increases the durability of reduction rollers in a finishing stand; this in turn reduces the amount of passes from one caliber (C) to another and increases the productivity of the mill even further. The calibrating rollers center the ellipse along a vertical sense, while the reduction in the C's of the rollers corrects the cross-sectional symmetry of the ellipse with respect to its major axes and improves its durability during deformation in the finishing C. The employment of calibrating rollers reduces the amount of sources responsible for surface flaws of the rolled rod stock.

B. Ye.

Card 1/1

137-58-4-7602

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Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p 177 (USSR)

AUTHOR: Ivantsov, G. I.

TITLE: A New Phenomenon in the Graphitizing of White Iron in a Silicon-

containing Hydrogen Atmosphere (Novoye yavleniye pri grafitizatsii belogo chuguna v atmosfere vodoroda, soderzhashchey

kremniy)

PERIODICAL: Sb. nauchn. tr. Magnitogorskiy gornometallurg. in-t. 1957,

Nr 11, pp 313-324

ABSTRACT: When specimens of white iron of the following percent composi-

tion: C 2.9, Si 1.35, Mn 0.29, previously polished, were held in a stagnant atmosphere of H₂, either pure or with added Si, at a temperature of appx. 1000°C, a new phenomenon was encountered; the polished surface acquired a microscopic relief after holding times (2 hours) inadequate to cause deep graphitization, but when Si was added to the atmosphere this microtopography took on the nature of eminences (E), the formation of which occurs considerably faster (15 min). When held long enough (1.5 hour), the ap-

pearance of a new, dark phase, which is then spontaneously replaced by cementite inclusions, is noted. The size and number

Card 1/2

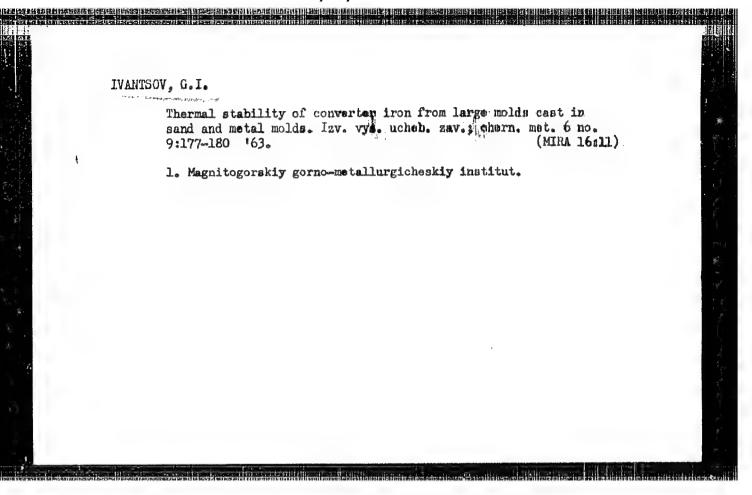
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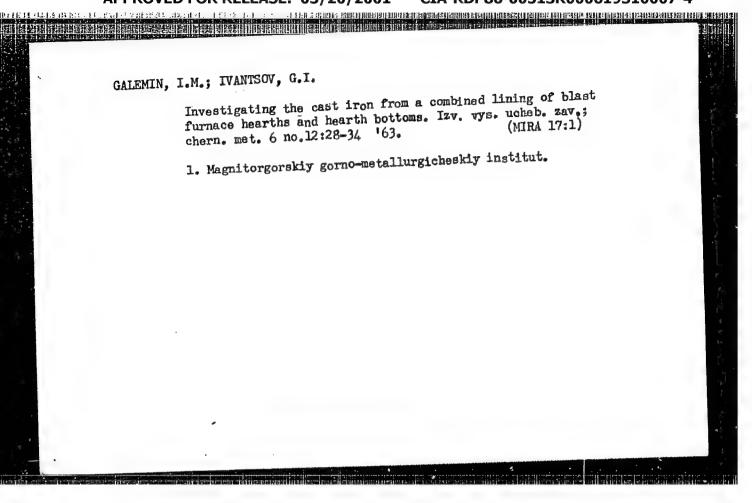
A New Phenomenon in the Graphitizing of White Iron (cont.)

of the E depend upon the rate of heating. An increase in temperature is accompanied by a diminution in the number of E and simultaneous increase in size. Chemical analysis shows an 0.1 percent rise in Si content in the surface layer of the specimens. Grinding off of an insignificant amount reveals the center of the E to be occupied by graphite surrounded by a metal matrix. On annealing in N₂, all other conditions remaining the same, graphitization proceeds in the normal manner, and no E are found. The author suggests the following explanation of the phenomenon observed: Holding in pure H₂ induces decarburization of the surface without graphitization, whereas, if Si is present in the gaseous phase, the H₂ will, as before, prevent graphitization at the surface, but the Si, saturating a thin surface layer, creates conditions favorable to the initiation of cavities containing graphite, and this leads to the formation of surface E.

1. Cast iron--Graphitization

Card 2/2





IEVIN, Ya.N.; IVANTSOV, G.I.

Determining the relation of interphase energies in the system copper - iron. Fiz. met. i metallowed. 16 no.4:535-539 0 (MIRA 16:12)

1. Magnitogorskiy gorno-metallurgicheskiy institut.

SHCHULEPNIKOVA, A.G.; IVANTSOV, G.I.

Resistance to abrasive wear of alloyed austenite and of a ferritecarbide mixture of equal hardness prepared from it. Metalloved. i term. obr. met. no.7:43-44 Jl '64. (MIRA 17:11)

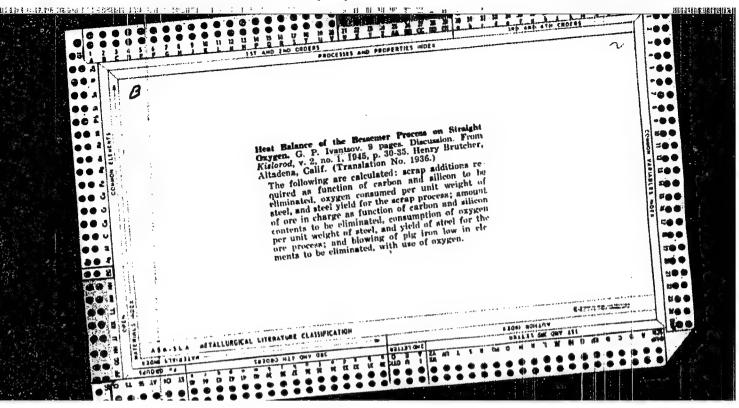
1. Magnitogorskiy gorno-metallurgicheskiy institut.

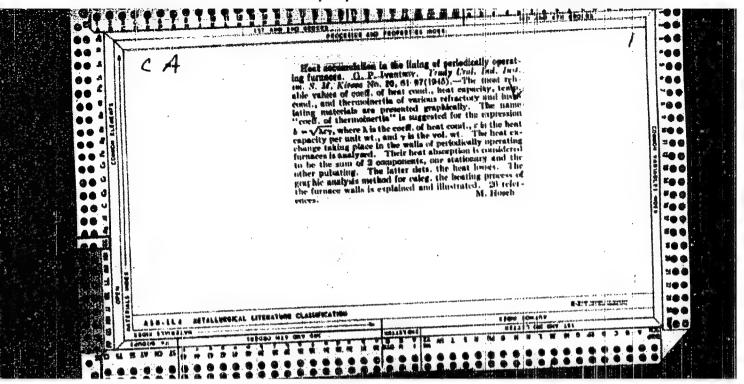
"On the Theory of Nonstationary Heat Flow in a Rectangular Paralleleptpedon and Prism," Zhurnal Tekhnicheskoi Fiziki, 1938, Vol 8, pp 948-959.

Reported affiliations: Central Scientific-Research of Ferrous Metallurgy.

Central Aero-Hydrodynamics Institute

Field of of Work: Generally heat flow in solids; ferrous metallurgy.



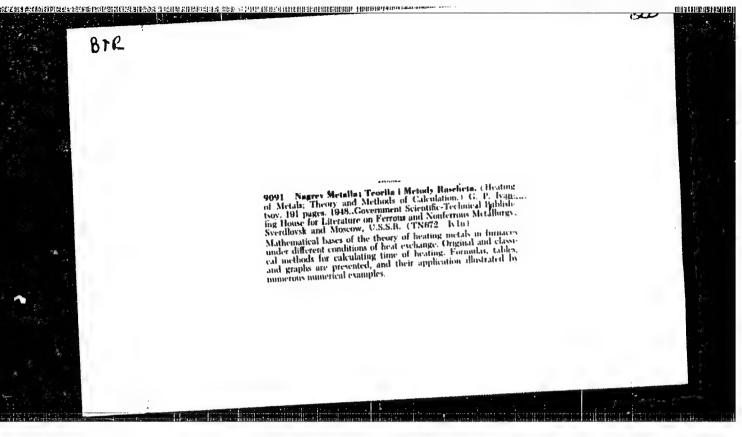


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"CR Acad Sci" Ve	ol XLIV, No 3		
Study of cases who (C) are functions	here conductivity and spo s of temperature	ecific heat	
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IVANTZON, G. P. PA 11790 1945 USSR/Physic Applied Refrigeration "Solution of the Problem of Cooling a Semi-space Filled by Matter at n Critical Foints Whose Intervals are Characterized by Different Physical Properties," G. P. Ivantzov, 2 pp "CR Acad Sci" Vol XLIX, No 4 Generalization of Stephan and Frank's solution for hardening of a soil bed of unlimited thickness, to the cooling of a semi-space filled with matter at n oritical points, corresponding to n critical temperatures, the passage of which is followed by the abscription or loss of heat 4790



INSR/Metals - Alloys, Crystallization Mbv 51

"Supercooling by Diffusion During Crystallization of a Binary Alloy," G. P. Ivantsov, Cen Spi Res Inst of Ferrous Metallurgy

"Dok Ak Nauk SSSR" Vol LUXXI, No 2, pp 179-182

Establishes that during crystn, realized by conduction of heat through solid phase, layer of supercooled melt is formed near front of crystn due to diffusion process which occurs in some adjacent to front of crystn. Under proper conditions crystals may be formed in supercooled layer, factor aiding formation of equiaxial cryst structure. Submitted by Acad I. P. Bardin.

1.9987

IVANTSOV, G. P.

PA 234152

USSR/Metallurgy - Crystallization

Apr 52

"On the Growth of the Spherical and Needle-Shaped crystals in a Binary Alloy," G. P. Ivantsov, Cen Sci Res Inst of Ferrous Metallurgy

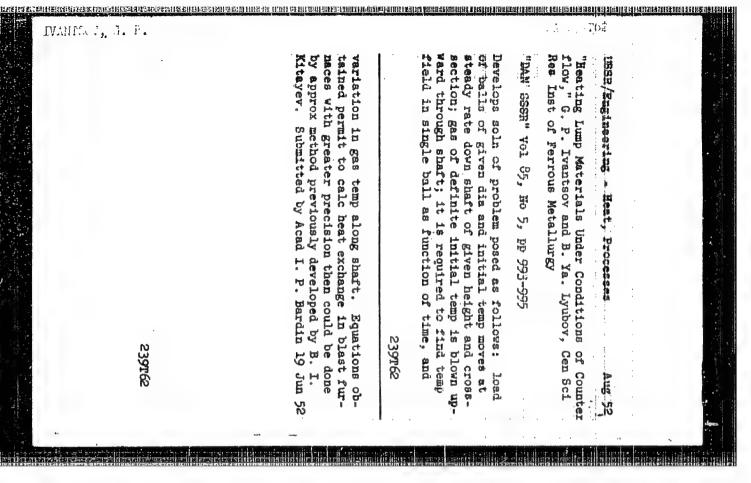
"Dok Ak Nauk SSSR" Vol 83, No 4, pp 573-576

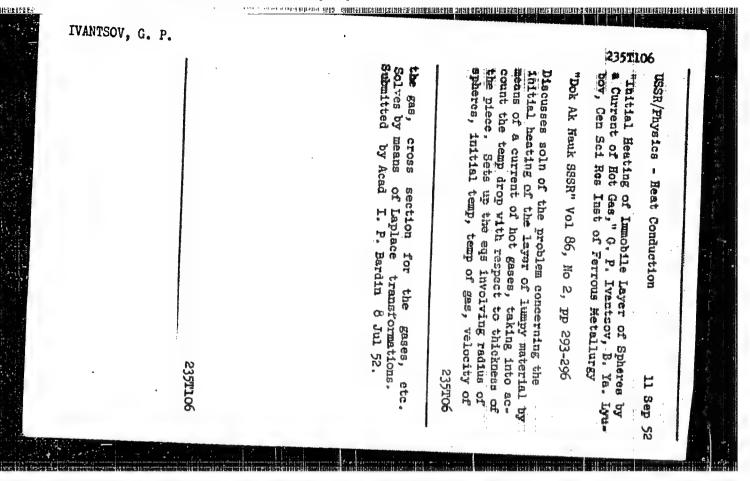
Using assumptions and definitions of previous works ("Dok Ak Nauk SSSR" Vol 81, No 2, 1951 and Vol 58, No 4, 1947), author analyzes crystn process in supercoaled melt of binary alloy, developing formulas for describing phenomena which occur in melt and trajectory of figurative point whose motion represents crystal growth. Submitted by Acad I. P. Bardin 6 Feb 52.

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"APPROVED FOR RELEASE: 03/20/2001

CIA-RDP86-00513R000619310007-4





IVANTSOV.

Call Nr: AF 1114656

AUTHOR:

See Table of Contents.

TITLE:

Thermotechnics of Ingots and Furnaces (Teplotekhnika slitka i pechey) Collected Works (Sbornik trudov)

PUB. DATA:

Gosudarstvennoye nauchno-tekhnicheskoye izdatel stvo literatury po chernoy i tavetnoy metallurgii, Moscow 1953, 2 (5) edition, 330 pages, 2,500 copies.

ORIG. AGENCY: Ministerstvo chernoy metallurgii SSSR. Tsentral'nyy nauchno-issledovatel skiy institut chernoy metallurgii.

Institut stali.

EDITORS:

Ivantsov, G.P.; Editor of the Publishing House:

Gordon, L.M.; Tech.Ed.: Attopovich, M.K.

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CIA-RDP86-00513R000619310007-4" APPROVED FOR RELEASE: 03/20/2001

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PODGORODHIKOV, Iosif Samuilovich, kandidat tekhnicheskikh nauk; IVANTSOV,
G.P., kandidat tekhnicheskikh nauk, redaktor; BASHKIROV, L.B.,
redaktor izdatel*stva; ZHOROV, D.M., tekhnicheskiy redaktor

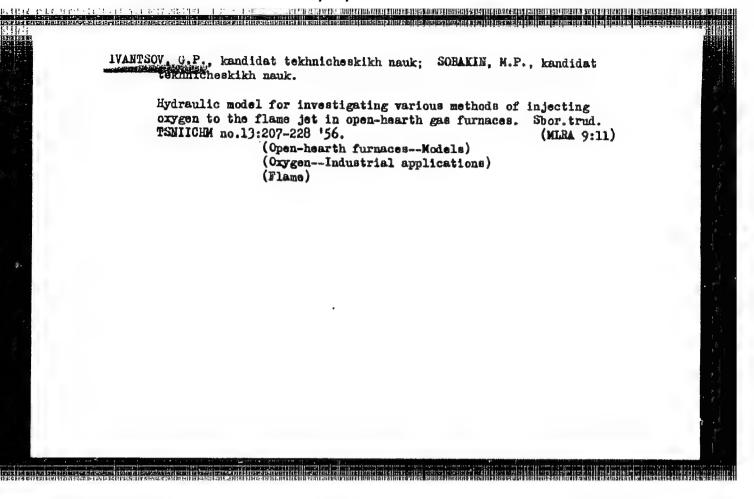
[Russian stoves "Teplushka-2" and "Teplushka-4"] Russkie pechi
"Teplushka-2" i "Teplushka-4.," Moskva, Izd-vo Ministerstva kommunal*nogo khoziaistva RSFSR, 1956. 157 p. (MIRA 9:10)

(Stoves)

IVANTSOV, G.P., kandidat tekhnicheskikh nauk; SORAKIN, M.P., kandidat tekhnicheskikh nauk; CHISTYAKOV, V.S., inzhener.

Best thermal conditions for smelting using oxygen. Shor.trud.
TEMNICHM no.13:153-170 '56.

(Zaporozh'ye--Smelting)
(Oxygen--Industrial applications)



AUTHOR: Ivantsov, G. P.

TITLE: Thermal and diffusion processes during crystal growth

SOURCE: Rost kristallov; doklady na Pervom soveshchanii po rostu kristallov, 1956 g. Moscow, Izd-vo AN SSSR, 1957, 98-109

TEXT: The author considers mathematically the following cases: (1) growth of a spherical crystal at constant mate;

Thermal and diffusion...

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D258/D307

isothermal, face centers being at the highest temperature; equations are given for the increases of temperature at face centers

and at apices, and for their difference. Increased rate of the centers

IVANISED G. P

137-1958-2-2487

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 2, p 42 (USSR)

AUTHOR: Ivantsov, G.P.

TITLE: The Thermal Aspect of Crystallization in an Ingot (Nekotoryye voprosy teplovoy storony protsessa kristallizatsii slitka)

PERIODICAL: V sb.: Fiz.-khim osnovy proiz-va stali. Moscow, AN SSSR, 1957, pp 749-764. Diskus. pp 781-791

ABSTRACT: Methods of mathematical physics were employed to analyze the crystallization process in a pure substance and in a binary alloy. A study was made of the thermal conditions of growth of individual crystals of elementary shape (polyhedral and acicular), which comprised the actual crystallization front. It was found that in the initial stage the growth of a crystal of a pure substance was limited not by the removal of heat but by the speed of the kineto-molecular processes occurring on the crystallization front. A solution is given for the problem of the growth of one spherical crystal at a constant linear speed in a supercooled male. A study

137-1958-2-2487

The Thermal Aspect of Crystallization in an Ingot

The temperature field of an acicular crystal is given. Conjointly with the study made of crystallization in a binary alloy, the diffusion and heat-transfer equations were also solved. A study was made of the crystallization of a crust consisting of a binary alloy and formed on a flat wall, the temperature of the external surface remaining constant. The locus line of the nominal melting points is shown in a phase diagram. V.G.

Bibliography: 8 references

1. Ingots--Crystallization 2. Ingots-Thermal proporties

3. Crystallization-Temperature effects

Card 2/2

137-58-6-11761

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 79 (USSR)

AUTHOR: Ivantsov, G.P.

TITLE: The Aero-hydrodynamics of the Oxygen Converter Process

(Aerogidrodinamika kislorodnogo konverternogo protsessa)

PERIODICAL: Tr. Nauchno-tekhn. o-va chernov metallurgii, 1957, Vol

18, pp 751-762

ABSTRACT: A study of the structure of an air stream blown into water

from below shows that the intense braking effect results in a sharp deceleration in its speed, and its cross section increases ("broad-flame regime"). At \geq 3.5 atm excess pressure, the flame is distinctly conical in shape. The blowing of steam and ammonia (assimilable gases) into water resulted in both instances in an intensive circulation of the bath. When the bath is top blown, the flow of oxygen agitates and attracts particles from the surrounding gas, and this is accompanied by the formation of eddies and a drop in velocities when the rate of motion of the stream is constant. An eddy-causing

lance with a central aperture was developed to reduce splash-

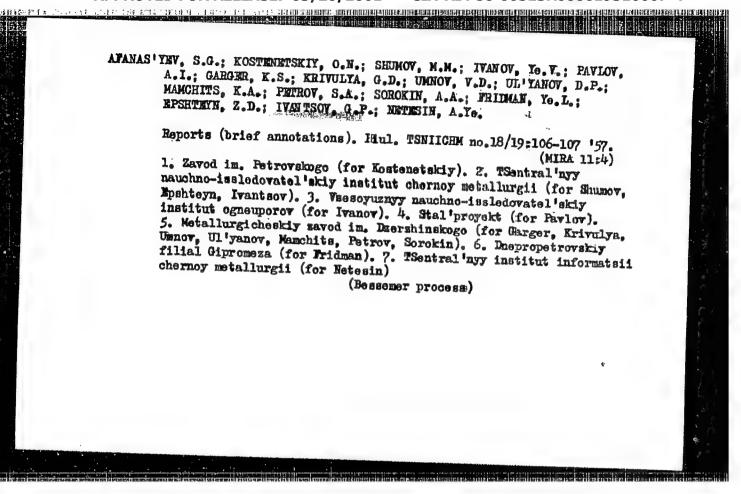
Card 1/2 ing of metal and slag when the bath is top-blown with oxygen.

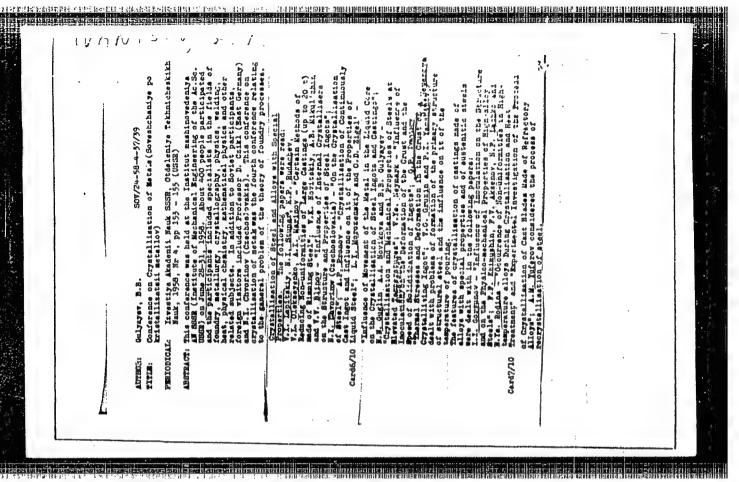
137-58-6-11761

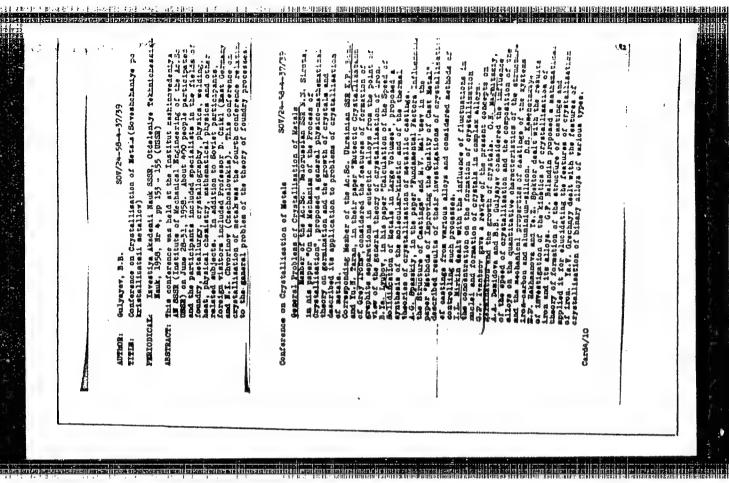
The Aero-hydrodynamics of the Oxygen Converter Process

As the stream of oxygen meets the bath it forms a reaction zone, the temperature of which is~2200-2500°C. The heat flow to which the water-cooled metal lance is subject within this interval is 1.83.106 to 2.90.106 kcal/m?hr, the bulk of which comes from radiation from the reaction zone. Consequently, there is a gas phase in front of the lance, and the lance may therefore be immersed beneath the slag-metal interface. For a metal lance to function properly under these conditions it has to be cooled intensively and uniformly, a fact that is confirmed by investigations made with models. The velocity of the cooling water must not be <8 m/sec, and the oxygen pressure in front of the lance must be ≥ 5 atm excess pressure. In the top-blown process, the major cause of agitation of the bath is the motion of the gases. Under these conditions the slag undergoes not so much a mechanical as a thermochemical effect. However, this situation is usually not considered in model tests. Intensive bubbling results in a high degree of uniformity in the concentrations of impurities and in temperatures throughout the bath. Further investigations should be directed toward perfecting the lances used for oxygen and combined blows, toward perfecting conditions of blow, and toward studying the aero-hydrodynamic and thermophysical processes occurring in a converter under oxygen blast. Bibliography: 12 references. 1. Steel--Production 2. Furnaces--Chemical processes 3 Gas flow--Analysis Card 2/2 4. Furnaces -- Heat transfer

B.G.







IVANTJOV, CT.

IUKNITSKIY, V.V. [deceased], doktor tekhn. nauk, prepodavatel'; SOKOLOV,
Ye.Ya., doktor tekhn. nauk, prepodavatel'; LMBELEV, P.D., doktor
tekhn. nauk, prepodavatel'; GIMMEL'FAHB, M.L., kand. tekhn. nauk,
prepodavatel'; IAVROV, N.V., doktor tekhn. nauk, prepodavatel';
IVANTSOV, G.P., kand. tekhn. nauk, prepodavatel'; GOLUBKOV, B.N.,
kand. tekhn. nauk, prepodavatel'; SHERSTYUK, A. N., kand. tekhn.
nauk, prepodavatel'; NIKITIN, S.P., kand. tekhn. nauk, prepodavatel';
CHISTYAKOV, S.F., kand. tekhn. nauk., prepodavatel'; DUDNIKOV, Ye.G.,
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GERASIMOV, S.G., prof., red.; KAGAN, Ya.A., dote., red.; AYZHENSHTAT,
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[Heat engineering handbook] Teplotekhnicheskii spravochnik. Moskva, Gos. energ. izd-vo. Vol.2. 1958. 672 p. (MIRA 11:10) (Heat engineering)

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Candidate of Technical Sciences

TITLE: Modelling of Casting a Continuous Ingot (Modelirovaniye

razlivki nepreryvnogo slitka)

PERIODICAL: Stal', 1958, Nr 7, pp 599 - 604 (USSR)

ABSTRACT: Hydrodynamics of the continuous casting of a slab,

600 x 150 mm, were studied on a model. In designing the model, the following assumptions were made: a) the

process of casting is isothermal and the movement of steel in an ingot is forced; b) injected (by the stream of steel) air does not dissolve in the metal; c) the crystallisation front is stationary (its velocity is very small in comparison with the velocity of movement of the liquid metal); d) the surface of the solidified

crust is smooth. Water was chosen as the modelling

liquid. The choice of dimensions and operating conditions was based on the equality of Reynold's, Weber's and

Frud's critera. The consumption of water corresponded to velocities of withdrawing ingots from 600 to 1200 mm/min.

The model was made from plexiglass, scale 0.6 of the natural (Figure 1). The dimensions of the upper part

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of the mould (crystalliser) and in the bottom part were decreased by the thickness of crust which was determined for a mean rate of withdrawing inget of 1 000 mm/min. The liquid was poured into the nodel through a funuel (Figure 2) and an intermediate capacity (Figure 3). The water was withdrawn at the bottom of the model. Casting controlled with a stopper and without control as well as open and sunk streams, were tested. The experimental results obtained are shown in graphs and photographs (Figures 4-9). Conclusions: 1) Observations of the movement of streams in models of casting equipment indicated that on casting through a funnel, a rotating movement appears in it. This increases hydraulic resistance of the funnel and, therefore, decreases the coefficient of consumption (throughput) of the liquid Moreover, as a result of the rotating movement of the liquid, it is directed along the surface towards the narrow faces of the ingot, carrying floating solid particles and slag and thus contaminating the surface of the ingot. Slag and non-metallic inclusions present in the Card2/6 stream are carried into the ingot. 2) On casting through

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an intermediate capacity the best results were obtained when the level of the liquid in the intermediate vessel is not lower than 100-120 mm and with a baffle plate on the bottom of the vessel, directing the stream towards the surface (for better separation of non-metallic inclusions). If the level was below 100 - 120 mm, this led to drawing in under the stopper, air bubbles and surface layers of the liquid. An increase in the height of the liquid level in the intermediate vessel helped to float non-metallic inclusions and decreased the spraying of the stream when casting without a stopper. The maintenance of the required level of the liquid and its throughput can be obtained by a suitable choice of the diameter of the feeder and by controlling with the stopper. On increasing the length of the intermediate capacity, the movement of the liquid becomes steadier which facilitates flotation of non-metallic inclusions and decreases the possibility of the latter being drawn into the ingot. 3) The coefficient of throughput of liquid through the casting equipment depends on the state of the stream (decreasing with its rotation) and on the degree of filling with the liquid of the cross-section Card 3/6

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of the equipment. 4) On casting with an open-stream, injection of air bubbles into the ingot is unavoidable and the depth of their penetration and their pulsation increases with increasing throughput of the liquid. With decreasing diameter of the feeder, the depth of penetration of air bubbles also increases somewhat, but due to a small height in the fall of the stream, their amount remains approximately the same. 5) Generally known advantages of casting with a sunk-in stream (under the level) in comparison with an open streem, (above the level) consist of the absence of injection of gases (at a liquid level in the casting equipment not lower than 50-80 mm) and a sharp decrease in the possibility of drawing into the ingot pieces of crust from the surface. The depth of penetration of a sunk-in stream into the ingot is 200-300 mm larger than that of the open stream. 6) The depth of penetration of air bubbles and of the stream during casting through 90° bent casting pipes is somewhat larger than when casting through straight ones. 7) The forms of movement of the liquid in the ingot are determined by the nature of the Card4/6 stream falling onto the ingot surface and are characterised

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by their instability (particularly when the rate of withdrawing of ingots is in the range of 1 000 - 1 200 mm/min), whereupon one form of movement is periodically replaced by another form. This is valid for both methods of casting with open and sunk-in stream. The periodic nature of the change in the form of movement decreases the non-uniformity of the washing of the crust by the stream of overheated metal and prevents the possibility of a localised melting of the crust but contributes to the formation of nonuniformity of the crust thickness during the crystallisation. Periodically appearing, intense ascending streams moving along narrow faces of the ingot were observed. These con tribute to the carrying out of non-metallic inclusions (particularly during casting with a sunk-in stream). In both cases of casting (open and sunk-in stream) the most intense movement was observed in the upper part of the ingot at a depth up to 500 - 1 000 mm, where melting of the injet crust with a stream of overheated metal is possible. Therefore, for the profile and casting equipment investigated it is advantageous to use the mould (crystalliser, of a length

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There are 9 figures and 5 Soviet references.

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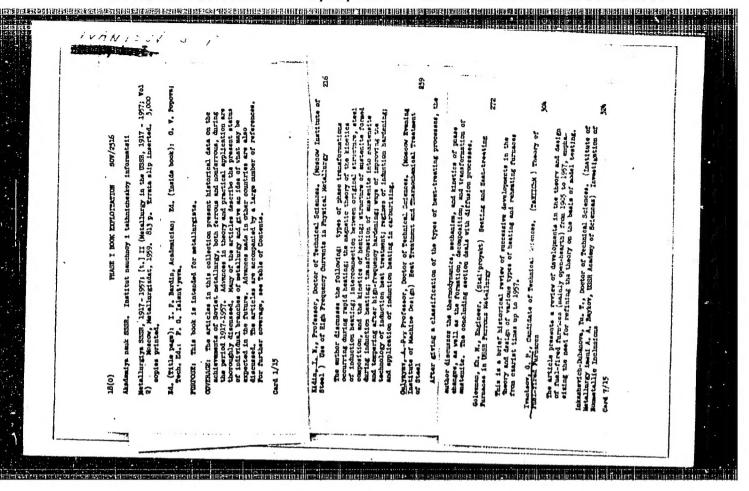
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1. Steel--Casting 2. Steel (Liquid)--Hydrodynamic characteris-

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PODGORODHIKOV, Iosif Samuilovich, kand.tekhn.nauk; IVANT'SOV, G.P., kand.tekhn.nauk, red.; MIRONOV, A.V., red.izd-va; PIRKINA, N.F., tekhn.red.

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